

## 6. OBSERVATIONS ON THE MATING BEHAVIOUR AND COPULATION IN *DRACO DUSSUMIERI* DUM. & BIB. (REPTILIA: SAURIA)

Aspects of mating behaviour in lizard have been studied in a number of families, namely Iguanidae, Chamaeleonidae, Gekkonidae and Agamidae by a number of workers. These studies show that lizards exhibit various stereotyped patterns of display during the mating season. I have been studying the bionomics of the South Indian Flying lizard, *Draco dussumieri* from 1962. An account of the sexual dimorphism, coloration and egg-laying of this lizard has been already published (John 1962). The present communication is a brief report on the mating behaviour and copulation of this lizard based on my observations in the field for the last few years, and particularly during the months of February, March and April, 1966.

*Courtship behaviour:* *Draco dussumieri* breeds during the summer months of February, March and April in Kerala, commencing from about the middle of February and ending by end April. Courting occurs during the low temperature periods of the day, between 9.30 and 12.30 in the forenoon and 2.30 and 4.30 in the afternoon, when temperature ranges from 86° F. to 104° F. and from 104° F.-90° F. respectively. These two periods of the day are the activity periods of the lizard in the sense that they feed and mate. During the period from 12.30-2.30 p.m., the temperature may go up to 118° F. and then fall to 104° F. and during this period they rest in shade. The movements of the lizards were followed with the help of a powerful pair of binoculars. Since these lizards have territories during the breeding season, it was easy to locate and follow them.

On seeing a female, the male becomes active in its movements, and continuously folds and stretches the gular appendage. Sometimes the erected gular pouch is held directed forwards and is vibrated vigorously. At times the head is bobbed up and down with the erected gular pouch, facing the female. The colour changes to a bright silvery grey which becomes conspicuous against the dark background of the tree. In a few minutes the male glides to the palm or the branch of the tree where the female is moving about and feeding, and gradually approaches but the female may move if it is not receptive. Sometimes, when the female stops the male moves towards it and facing it, vibrates the erect gular pouch and bobs the head. With raised body and stiff tail lifted up the male crouches and slightly bending the body laterally outwards, circles around the female in a clock-wise direction moving with a characteristic jerky gait. The female remains impassive and the circling male touches the pelvic region of the female with its erected gular pouch during the second round. I have seen it repeated a dozen times within half an hour, with

no response from the female. But the persuasion is continued. Normally, the culmination of this 'courtship dance' is copulation but it depends upon the gonadial condition of the female and if the female is not in a reproductively active state, it will not submit. This is perhaps the reason why the female is indifferent towards the courting behaviour of the male during the early period of the breeding season. The male also may discontinue its courting when there is no response from the female but starts again after some time. During the courtship period the male does not feed.

*Copulation:* Though courting was seen every day during the breeding season, copulation was observed only twice and that too only towards the later half of the season. On 6 April, 1966 at 10.30 a.m., a male and a female were seen feeding on the same tree. The day was clear after a shower on the previous evening and the ambient temperature was 96° F. The male began displaying its gular pouch and followed the female, who was reluctant in the beginning and avoided contact. During their courtship movements, they went up and down the tree several times, the male closely following the female and starting its 'dancing' movements every time the female stopped. But when touched on the pelvic region, the female moved off. This was continued for half an hour. Finally the female turned and moved towards the male, with the rudimentary gular pouch moving indicating response. They moved a short distance touching each other, after which the male mounted and was seen biting the nape of the female, who lifted the vent and slightly tilted to one side so that the cloacas of both were brought in opposition. They remained in the position for about one minute. No thrusting movement was noticed. They then turned in opposite directions and separated. The courtship and copulation took about 30 minutes.

*Reaction to other males:* During the mating period, any intruding male will be chased away. The resident male will show the characteristic 'fight behaviour,' which is similar to courtship display in its earlier stages, in that it is also characterised by head jerks and movement of the gular pouch. This is followed by unfolding and folding of the patagium, advancing forwards and retreating, and moving to one side and the other. All these displays are meant to intimidate the intruding male. But this appears to be only a threat since no fight has been actually noticed under these circumstances. This fight behaviour is a part of the "territorial response" of the male to safeguard the territorial integrity.

*Discussion:* Noble and Bradley (1933) observed that male displays were reserved largely for rival males and that male adornments are used in sex recognition. Studies of H. R. Bustard (1965) on *Chamaeleo hohnelii* (Steindachner) substantiated these observations. Besides, Evans (1938), Noble and Greenberg (1941) and Harris

(1964) have shown that the female lizard may take an active part in the preliminaries to mating. My observations on the mating behaviour of *Draco dussumieri* show that male displays are not directed to intruding males. Though the preliminary male displays are similar to fight behaviour in this lizard, the later 'courtship dance' or 'parade' around the female is quite different from the ritualized combat behaviour and is not a part of the fight behaviour. Also the female is passive and the male takes the active part in courtship.

Carpenter (1962) while making a comparative study of the display patterns of *Urosaurus*, *Uta* and *Streptosaurus* noted that in these lizards, courtship behaviour began similarly to the territorial defence with arching, rapid approach, circling and bobbing, but soon shifted to typical courtship behaviour which consists of rapid and shallow courtship bobs. A similar situation prevails in *Draco* also.

The prolonged curious antics, 'courtship dance', and the excited movement of the bright yellow gular pouch and the 'head jerks' shown by the male of *Draco* are useful in sex recognition and eliciting 'mating response' in the female. This is really very important in *Draco* because the female is very passive. Contrary to the observations of Evans (1938), Noble and Greenberg (1941) and Harris (1964), the female takes no part in the preliminaries to mating.

Tinbergen (1953) concluded that many behavioural patterns of lower animals are psychologically primitive and involve 'social releasing mechanisms.' Evans (1938), Hunsaker (1962) and Harris (1964) investigated the releasing mechanisms in species and sex discrimination in lizards. According to Evans (1961) Iguanids and Agamids employ sight stimuli predominantly and Scincids and Geckonids generally rely on scent and sound. G. W. Ferguson (1966) investigated the relative roles of several factors which might serve as releasers of courtship and territorial behaviour in *Uta stansburiana*. In *Draco dussumieri* the elaborate 'courtship dance' is directed to elicit mating response in the female and visual stimuli plays the vital part.

#### SUMMARY

1. Courtship behaviour of the South Indian Flying lizard, *Draco dussumieri* has been studied in the field. It consists of an elaborate 'courtship dance.' Female is passive and the male takes the active role in courtship.
2. On two occasions copulation was observed.
3. During the mating season male shows characteristic 'fight display' towards other males.
4. The results of the study have been discussed in the light of available literature.

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## 7. THE HOODED *MALPOLON*, *M. MOILENSIS* (REUSS) AND NOTES ON OTHER SNAKES OF NORTH-EASTERN ARABIA

(With a plate)

Corkill and Cochrane have done students of Arabian fauna a considerable service with the publication of their excellent summary of Peninsular herpetology (*J. Bombay nat. Hist. Soc.* 62: 475-506). I was specially interested in the reference to previous records of *Malpolon's* ability to produce a cobra-like hood and the question as to whether Arabian specimens exhibit this behaviour. On two occasions this year I saw *Malpolon moilensis* (Reuss) erect a hood; the demonstrations were so convincing that both times I was certain that I had finally come upon *Naja* until I had had a look at the mouths of the killed specimens and had counted scales.

My first experience with *Malpolon* was on 11 February 1966, three km. south of the Dhahran Airport in sandy country sprinkled with shrublets of *Zygophyllum coccineum*. The snake, abroad at midday, raised his head more than a foot above the ground at my approach, dilated its neck laterally to a marked degree, and stood its ground. When